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Defense AGAINST FOREIGN ANIMAL DISEASES

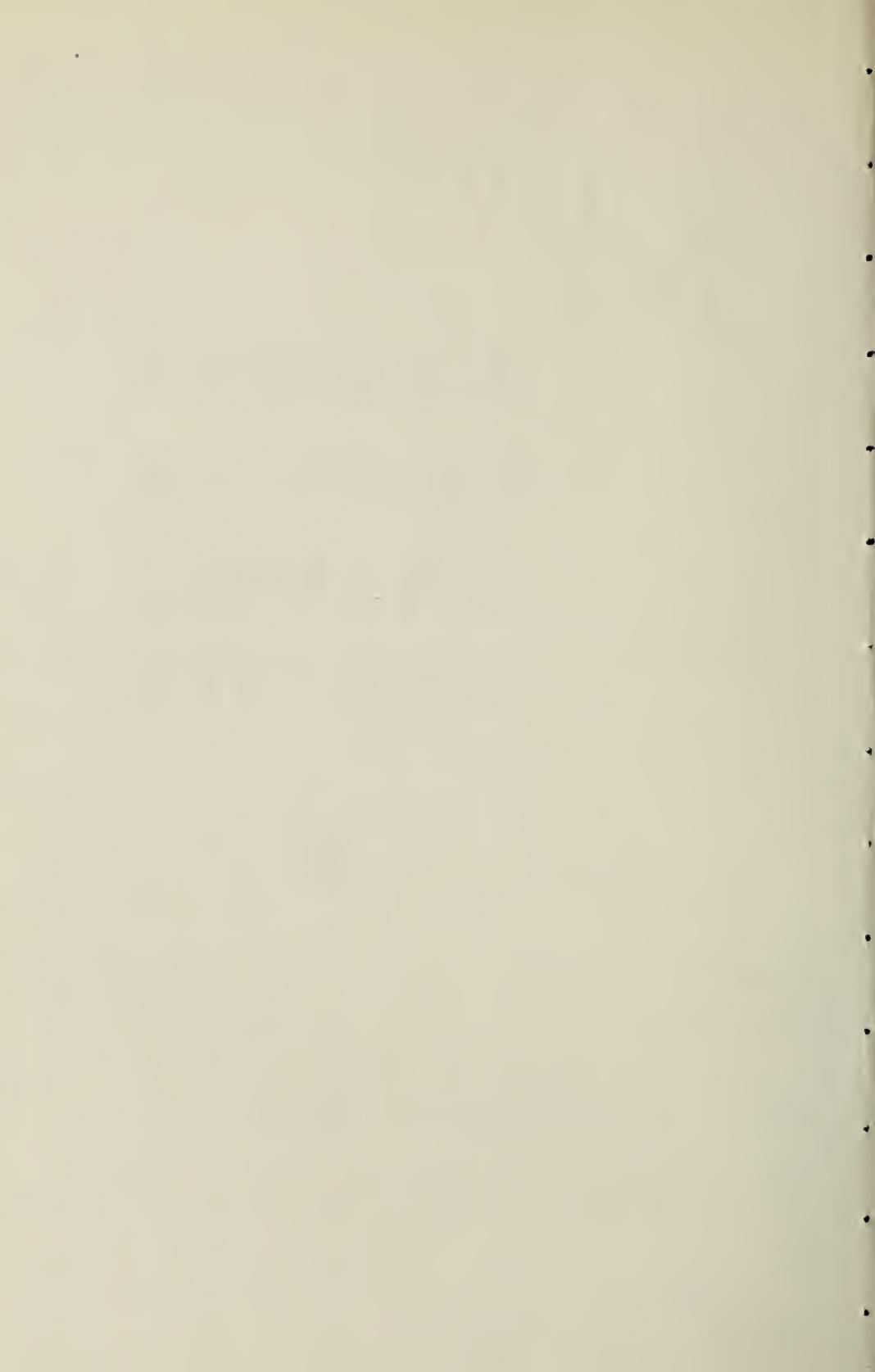


BUREAU OF ANIMAL INDUSTRY
Agricultural Research Administration
UNITED STATES DEPARTMENT OF AGRICULTURE

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FOREWORD

The possibility of attacks on our livestock industry by agents of biological warfare is stressed in the booklet "Health Services and Special Weapons Defense", recently published by the Civil Defense Administration. In presenting the subject the Civil Defense Administration pointed out that attacks may be made by sabotage before any act of open warfare. The United States Bureau of Animal Industry and the State livestock sanitary officials accordingly have turned their attention to devising measures of defense. These include the detection, identification, control, and eradication of dangerous diseases of livestock, particularly those foreign to this country. Of immeasurable value in this work is the experience of more than a half a century in controlling and eradicating foot-and-mouth disease, contagious pleuropneumonia, and European fowl pest.

Prompt reporting of an outbreak of a new disease is the first requisite for success in controlling and eradicating it. That is a job for the livestock owner, the practicing veterinarian, the county agent, the experiment station worker, or any other person having evidence of its existence. Reporting the unusual occurrence or spread of one of the diseases common to this country is equally important. *Each case should be immediately reported to the State livestock sanitary official or the Bureau of Animal Industry inspector in charge of field activities in the State.* They are responsible for control and eradication, whether the disease is introduced accidentally or as an act of sabotage. Prompt reporting will give them a chance to carry out their responsibility successfully. The Bureau has trained a number of its field veterinarians to work with the inspectors and livestock sanitary officials in diagnosing and handling outbreaks.

Several communicable animal diseases most likely to be used in biological warfare do not exist in this country. Past outbreaks of foot-and-mouth disease, European fowl pest, and

Asiatic Newcastle disease have all been eradicated. Consequently, few veterinarians in this country have had opportunity to become familiar with them. This leaflet has been prepared to help meet the need for more widespread information about such diseases. It outlines the important highlights of information about foot-and-mouth disease, rinderpest, European fowl pest, and the domestic and foreign types of Newcastle disease.

You can help by immediately reporting evidence of the existence of any of these diseases to the proper authorities.

B.T. Simms

Chief of the Bureau

FOOT-AND-MOUTH DISEASE

OCCURRENCE:	World-wide - except United States, Canada, Australia, New Zealand, Central America, Channel Islands, Ireland, North Ireland, and Norway.
ETIOLOGY:	Filtrable virus - 6 distinct immunologic types - A, O, C, and 3 recently identified African types, with variants within types.
SPECIES SUSCEPTIBILITY:	Cattle, sheep, goats, other ruminants and swine; deer, buffalo, camel, llama, giraffe, antelope; guinea pigs, and to a slight degree some other laboratory animals. Equines are insusceptible. Man may become infected but such cases are rare, of mild character, and of no public health significance.
TRANSMISSION:	Fluid and coverings of vesicles, saliva, milk, urine, blood, meat, glands, etc., are infective. Disease spreads rapidly from animal to animal and herd to herd, being transmitted through contact with infected animals or premises and by way of contaminated feed and other materials. Man may spread disease on contaminated person or clothing.
SYMPTOMS	Vesicles, or blisters, appear in the mucosa of the tongue, lips, gums, cheeks, palate and pharynx; the skin of the coronary band and the interdigital spaces; teats and udder, snouts of swine. Fever accompanies the vesicle formation. Rupture of the vesicles occurs within 24 hours. Red, granular erosions, with or without ragged fringes of partially detached necrotic epithelium persist for several days. Marked salivation

FOOT-AND-MOUTH DISEASE, continued

SYMPTOMS: (continued)	accompanies vesicles and early erosions. Lameness accompanies the foot lesions, which may cause separation and shedding of the hoof wall. Loss of weight. Depression and markedly reduced milk flow. Abortion. Mortality- 3 to 50% (mostly in young). Complications such as mastitis and other bacterial infections.
INCUBATION PERIOD:	2 to 4 days usually.
COURSE:	The primary vesicles usually appear in the mouth. Secondary vesicles usually follow the primary in about 24 hours, appearing at any of the sites of predilection. Lesions tend to heal progressively in 2 or 3 weeks but healing may be delayed indefinitely by intercurrent bacterial infection, particularly in the feet.
POST-MORTEM FINDINGS:	Lesions described under symptoms above at indicated sites. Vesicles and/or erosions commonly found on pillars of rumen. Young animals may die suddenly without displaying typical symptoms and lesions. In such cases, petechiate hemorrhages, and grayish-yellow streaking of heart muscle (tiger heart) may be present.
DIAGNOSIS:	Differential animal inoculations on premises by specially trained diagnosticians - complement fixation tests followed by observations of test animals.
METHODS OF CONTROL AND ERADICATION:	Quarantine, slaughter of infected and exposed animals, cleaning and disinfection of infected premises. Vaccination of susceptible animals is practiced widely for control in

FOOT-AND-MOUTH DISEASE, continued

METHODS OF CONTROL AND ERADICATION: countries where disease has become established.

IMMUNIZATION: Vaccine effective approximately 4 months - subcutaneous or intradermic. Immunity from natural disease - approximately 1 year.

DISINFECTANTS: Sodium hydroxide 2%) effect attributable to alkalinity.
Sodium Carbonate 4%) (preferably hot).
Approved cresylic acid disinfectants.
In absence of proper cleaning and disinfection, virus may under proper conditions survive for weeks or months outside the animal body.

RINDERPEST (Cattle Plague)

OCCURRENCE: Asia, Africa, Eastern and Southeastern Europe.

ETHIOLOGY: Filtrable virus - one immunologic type only, so far as is known.

SPECIES SUSCEPTIBILITY: Cattle and buffalo are highly susceptible; other ruminants (sheep, goats, deer, gazelle, etc.) and swine are variably less susceptible.

MODE OF SPREAD: Blood, saliva, urine, feces, nasal and vaginal discharges are infective. Disease spreads through contact with infected animals or by contaminated feed, water, etc.

INCUBATION PERIOD: 3-14 days, depending on method and degree of exposure.

RINDERPEST (Cattle Plague), continued

SYMPTOMS: Initial temperature rise 106° F. or higher; usually occurs before other symptoms and drops following appearance of diarrhea. Depression or excitement, diminished milk secretion. Mucous membranes (mouth, nose, rectum, vagina, conjunctiva) scarlet or dark red, with or without petechiae. Respiration and pulse accelerated. Profuse lacrimation, later mucous then purulent discharge. Frequent painful cough. Constipation during fever, followed after a few days by hemorrhagic diarrhea. Nasal discharge - tenaceous, moco-purulent. Ulcers - mouth, nose, with fibrino-purulent exudate (may not be present). Marked loss of weight. Death - 4-7 days. Young animals not so apt to show full syndrome of symptoms as adult animals.

COURSE: Average 4-7 days from onset to death. In some outbreaks, rinderpest spreads less rapidly than foot-and-mouth disease, partly because of the comparatively extended incubation period. In many epizootics, however, the infection has spread with great rapidity. Mortality rate 75% or higher in susceptible cattle.

POST-MORTEM FINDINGS: Emaciation, dehydration; hemorrhagic, catarrhal, and sometimes ulcerative inflammation of mucous membranes. Superficial, yellowish-gray, cheesy patches overlying ulcerous areas of abomasum. Hemorrhagic pseudo-membranous patches in other organs. Septicemic hemorrhages. Heart flabby and friable. Spleen usually normal; lymph nodes swollen and hemorrhagic. Limited consolidation of lungs may be present. All of the typical symptoms and lesions seldom occur in a single animal, even an adult.

RINDERPEST (Cattle Plague), continued

DIAGNOSIS: Cattle inoculations and complement fixation and serum neutralization tests by trained diagnosticians.

METHODS OF CONTROL AND ERADICATION: Quarantine, prompt slaughter of affected and exposed animals, cleaning, disinfection. (Vaccination is practiced generally in countries where disease is enzootic.)

IMMUNIZATION: Long-lasting immunity follows recovery from rinderpest. Chemically inactivated virus vaccines or attenuated live virus propagated in chicken embryo, rabbit or goats. The type of vaccine used depends primarily on the relative resistance of the cattle population involved.

DISINFECTANTS: Sodium hydroxide - 2%. While the virus has been reported to be relatively easily destroyed by light, heat, and drying, it should for practical purposes be considered as no less resistant than the virus of foot-and-mouth disease.

FOWL PEST (Fowl Plague)

OCCURRENCE: Europe, probably also in Asia and North Africa and possibly South America.

ETIOLOGY: Virus types - only one type known.

SPECIES SUSCEPTIBILITY: Chickens, turkeys, and perhaps other barn-yard fowl. Pigeon's generally considered resistant.

TRANSMISSION: Direct from bird to bird through respiratory and fecal discharges. Indirectly by feed

FOWL PEST (Fowl Plague), continued

TRANSMISSION: bags, visitors, offal from poultry dressing (continued) establishments, predatory animals, etc.

INCUBATION: Incubation period 2-5 days, average 3 days.

MORTALITY: Nearly 100%.

SYMPTOMS: Acute deaths, similar to fowl cholera -- comb and wattles cyanotic, profuse lacrimation, conjunctiva hemorrhagic and swollen. Grayish or hemorrhagic tenaceous exudate -- nose and mouth, hemorrhages buccal mucous membrane, profuse diarrhea -- greenish yellow. Edematous swellings of the face and wattles.

COURSE: 2-4 days -- 7-8 exceptionally.

POST-MORTEM FINDINGS: The lesions common to septicemia diseases -- punctiform hemorrhages -- mucosa of pre-ventriculus (glandular stomach), pericardium, peritoneum, gizzard fat; hyperemia of spleen and kidney. Fibrinous exudate on pleura and peritoneum. Hemorrhagic mucous in mouth and nose. Edematous swellings of the face and wattles.

DIAGNOSIS: Bacteriological examination - absence of organisms. Differential animal inoculation - pigeons, chickens. Serology - test in embryos same as for Newcastle disease. Must be differentiated from fowl cholera, Newcastle disease, streptococcic (apoplectiform) septicemia, and perhaps botulism and phosphorous poisoning.

Tests conducted only in properly equipped laboratory by qualified poultry disease pathologists.

FOWL PEST (Fowl Plague), continued

METHODS OF CONTROL AND Quarantine, slaughter, disinfection and vaccination as last resort.

ERADICATION:

PREVENTIVE No vaccine is available which has been field-tested.

DISINFECTANTS: 2% sodium hydroxide applied with power sprayer. Approved cresylic acid disinfectants.

NEWCASTLE DISEASE (Avian Pneumoencephalitis) (Pseudo Fowl Pest)

OCCURRENCE: Asia, Dutch East Indies, England, Europe, United States, Mexico, Panama, possibly South America, South Africa.

ETIOLOGY: Virus. Asiatic and European types of virus definitely known to be more severe with a much higher mortality rate than type present in this country.

SPECIES: Chickens (all ages), turkeys, pigeons, geese, **SUSCEPTIBILITY:** ducks, and other barnyard fowl and game birds such as pheasants, partridge, etc.

TRANSMISSION: Direct from bird to bird through respiratory and fecal discharges. Indirectly by feed bags, visitors, offal from poultry dressing establishments, predatory animals, etc.

SYMPTOMS: *Domestic types of Newcastle disease* - Chicks and broilers show respiratory symptoms resembling infectious bronchitis and laryngotracheitis; difficult breathing and gasping; depression and weakness. Nervous symptoms

NEWCASTLE DISEASE (Avian Pneumoencephalitis)
(Pseudo Fowl Pest), continued

SYMPTOMS: (continued)	follow with paralysis one or both legs and/or wings. Altered equilibrium, somersaulting, walking backwards, twisted head and neck, tremor of head.		
	Adult birds -- respiratory distress, sudden cessation of egg production.		
	<i>European and Asiatic types</i> - Acute illness in almost entire flock simultaneously, followed in 24 hours by high mortality. Lingering illness in a few birds which may develop spasms or paralysis. Survivors, if any, recover slowly, several weeks or longer being required.		
MORTALITY:	<i>Domestic types</i>	<i>European and Asiatic types</i>	
	chicks 40-90%		
	broilers 10-30%	broilers or younger	100%
	adults 2-5%	adults	nearly 100%
INCUBATION PERIOD:	2-14 days, average 5 days		
COURSE:	<i>Domestic types</i> - Spreads rapidly through flock in just a few days. Several weeks required for survivors to recover. Egg production returns to normal in about one month.		
POST-MORTEM FINDINGS:	Air sac membranes cloudy -- contain lemon yellow exudate. Some birds develop a chronic air sac inflammation resulting in the formation of caseous casts which may completely fill the anterior air sacs.		
	Exotic strains may be expected to produce petechial hemorrhages on the serous and mucous membranes of the internal organs.		

**NEWCASTLE DISEASE (Avian Pneumoencephalitis)
(Pseudo Fowl Pest), continued**

DIAGNOSIS: Clinical - History and symptoms observed. A respiratory disease followed by nervous manifestations (see symptoms) suggests Newcastle disease.

Laboratory - 1. Virus isolation in chicken embryos.
2. Serum-neutralization tests using serum from recovered birds.
3. Hemagglutination and hemagglutination inhibition tests.

Tests conducted only in properly equipped laboratory by qualified poultry disease pathologists.

Must be differentiated from infectious bronchitis, laryngotracheitis and coryza.

METHODS OF CONTROL AND ERADICATION: Quarantine, disinfection, slaughter, vaccination.

PREVENTIVE IMMUNIZATION: Killed virus vaccine - temporary immunity. Attenuated live virus - lifelong immunity (type of live virus used in intranasal vaccine does not produce permanent immunity).

DISINFECTANTS: 2% sodium hydroxide applied with power sprayer. Approved cresylic acid disinfectants.

SURVIVAL OF VIRUS: Poultry houses should be vacated for a minimum of 30 days before restocking. In cold weather virus will survive longer than in warm weather.

